



# UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGION 1

October 14, 1999

## Baird & McGuire Superfund Site

The U.S. Environmental Protection Agency (EPA) has been working since the early 1980's to address contamination at the Baird and McGuire Superfund Site in Holbrook, MA. With the completion of the soil incineration phase of the cleanup in June 1997, EPA's focus has been on the cleanup of the groundwater contamination which accumulated during the more than seventy years the Baird & McGuire chemical manufacturing and batching facility operated. This is an update on recent EPA activities to address the groundwater contaminants which are similar to those that were found in the soil, including pesticides, arsenic and solvents.

### CLEANING UP THE GROUNDWATER

#### What is LNAPL?

From yearly contaminant plume evaluations, light non-aqueous phase liquid, or LNAPL, was determined to be a major source of groundwater contamination. LNAPL refers to any chemical that, either alone or in combination with other chemicals, is lighter (less dense) than water. Because these

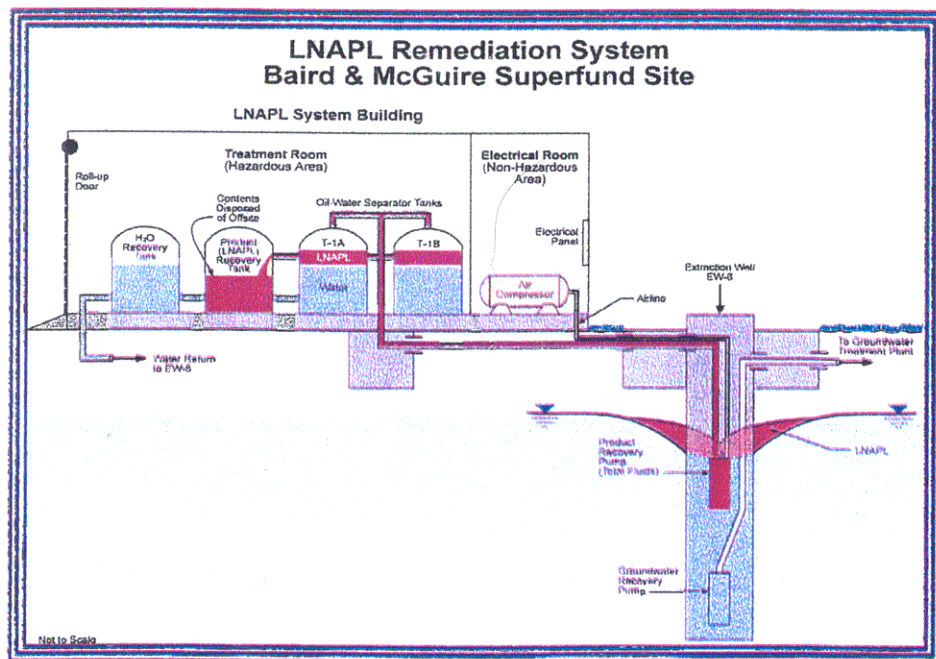
various undissolved chemicals are lighter than water, they float on top of the ground water. The pools of LNAPL dissolve extremely slowly into groundwater, acting as a continuing source of groundwater contamination.

The presence of LNAPL at Baird & McGuire Site is not a new problem. EPA knew as early as 1985 that a pool of contamination was floating on the ground water. When the

1986 cleanup plan was developed for the Baird & McGuire Site, it was expected that the LNAPL would eventually be handled by the groundwater extraction and treatment system. However, relatively new techniques now exist which can be used to directly remove the LNAPL from the ground water surface.

#### How is LNAPL Removed?

The LNAPL removal system captures the chemicals floating on top of the groundwater by using total fluids recovery pumps in wells located within the LNAPL pool (LNAPL is currently being removed from extraction well EW-8 and pumps will soon be installed in two monitoring wells to enhance removal). The water is re-circulated through the wells while the recovered LNAPL is mixed with crushed corn cobs in order to solidify the liquid, thus making it safer and easier to transport it to Utah for incineration.





## A New Cleanup System

An LNAPL removal system was installed in February 1999 and was fully operational by June 1999. It is removing LNAPL at a rate of six to eight gallons per day and has collected 1,221 gallons of LNAPL as of the end of August 1999. It is estimated that it will take two to three years for the recovery system to remove LNAPL at the site.

## GROUND WATER EXTRACTION & TREATMENT FACILITY

The groundwater treatment facility has been in operation since 1993 and continues to contain and remove the plume of contaminated groundwater at the Baird & McGuire Site. The cleanup of the groundwater includes its extraction, treatment, and reintroduction. Seven extraction wells pump groundwater into the treatment facility which then removes the contamination before reintroducing the treated water back to the groundwater through four infiltration basins.

## Is the Treatment Facility Doing its Job?

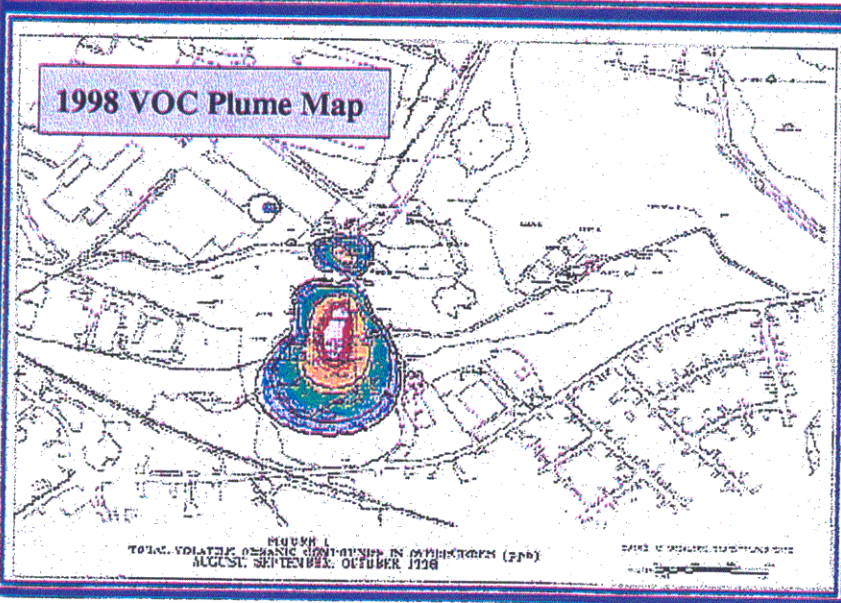
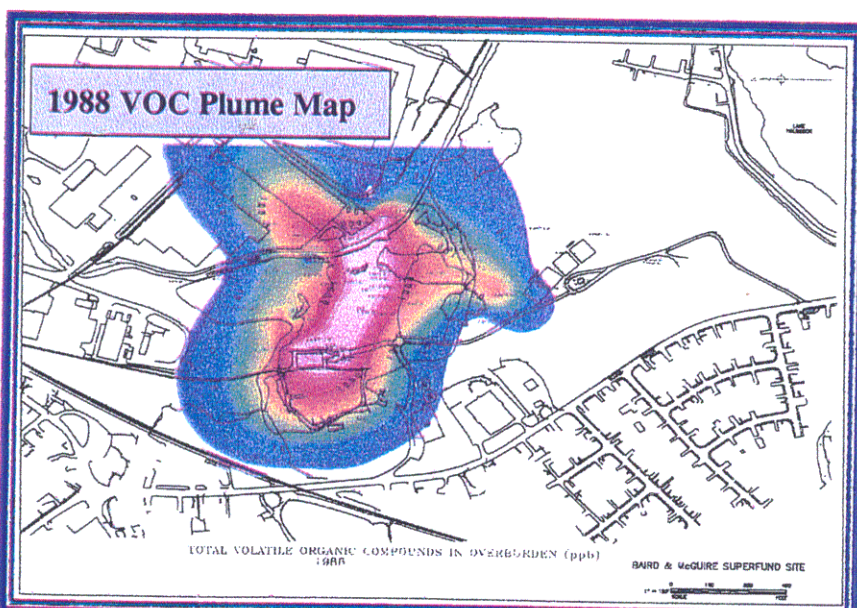
To make sure that the groundwater contamination has not expanded and to check whether the cleanup system is working, EPA conducts evaluations that include sampling the groundwater and creating contour or "plume" maps of total volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) found in the groundwater. The maps provide a visual means of tracking the contamination plumes and gauge progress.

**VOCs** (volatile organic compounds) are a group of chemical compounds composed primarily of carbon and hydrogen that are characterized by their tendency to evaporate -or volatilize- into the air from water or soil.

**SVOCs** (semi-volatile organic compounds) are similar to VOCs except they only partially volatilize into air and are typically less soluble in water than VOCs.

Four quarterly sampling rounds, including one comprehensive round of the majority of the Site monitoring wells, are performed each year. Plume maps were created for the years 1988 (prior to system start-up), 1995 (two

years after start-up), 1997 (following source control remediation) and 1998. A comparison of these maps indicates that the plumes of VOCs and SVOCs have decreased in size over time --the edges of the plumes have moved inward toward the source. Contamination concentrations have decreased over time as well. There has been a significant shrinkage of the groundwater contamination plume between 1988 and 1998. The LNAPL removal system is expected to further reduce the plume.





### **Did You Know?**

- Approximately six million gallons per month or 150 gallons per minute of groundwater are treated in the Baird & McGuire Groundwater Extraction and Treatment Facility.

- About one ton of sludge a day is extracted from the groundwater during the treatment process.

### **Y2K Ready**

New laboratory equipment was installed in Summer 1999 in the Baird & McGuire Groundwater Extraction and Treatment Facility to make sure the facility will not encounter computer glitches with the start of the new millennium.

### **Is Contamination Discharging into the Cochato River?**

Because the contaminant plume extends across the Cochato River, there has been concern that contaminants may move from the groundwater into sediments in the river. In April 1998 the United States Geologist Survey (USGS) investigated the potential discharge of groundwater into the river. Although the results of the study suggested that groundwater at the time of the study's sampling could have

been discharging into the river, it was conducted when the system was operating at below capacity due in part to the fact that construction of the newest extraction well (EW-7) was not complete. In addition, an unusual extreme rain had occurred causing higher than normal groundwater levels and gradients. The new extraction well began pumping in June 1998 and is located where the concentration of contamination is highest. In addition, EPA is considering measuring the water levels of the Cochato River as a means of determining whether it is a "gaining" or "losing" river. If it is a gaining river, it is likely that the groundwater is moving into the surface water which then travels into the river. If it is a losing river, then it is likely that groundwater does not move into the river. With the effects of the EW-7 extraction well and the determination of what type of river the Cochato is, the EPA will be better able to determine if contaminated groundwater is entering the river's sediments.

### **DONNA ROAD WATER TREATMENT PLANT**

EPA has offered the Town of Holbrook a supplemental public water source, replacing the water supply lost due to the groundwater contamination at the Baird & McGuire Site. The

Donna Road Water Treatment Plant is needed to remove excess iron and manganese from the groundwater and to provide chlorination before introducing the water into the distribution system.

The Massachusetts Department of Environmental Protection (DEP) developed a conceptual design for the automation of the plant which is currently being considered by the Joint Water Board of Holbrook and Randolph. DEP will be meeting with the Joint Water Board this fall to discuss the financing of the project, especially the operation and maintenance costs.

### **For More Information on the Baird & McGuire Superfund Site, Contact:**

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